

Seasonal sea ice area and volume production of the Arctic sea ice cover: A contrast of two winters - 1996/97 and 1997/98

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The RADARSAT Geophysical Processor System (RGPS) produces measurements of ice motion and estimates of ice thickness using repeat synthetic aperture radar (SAR) maps of the Arctic Ocean. From the RGPS products, we can estimate the net deformation and advection of the winter ice cover using the motion observations, and the seasonal ice area and volume production using the estimates of ice thickness. We compare these estimates from winter of 1996/1997 and the winter of 1997/1998. The second winter is of particular interest because it coincides with the SHEBA field program. The character of the deformation of the ice cover from two years is very different. Over a domain covering a large part of the Western Arctic Ocean, the net divergence during the six months of first winter was 2.7% and the net divergence of the second winter was more than 9%. Most of the divergence during the SHEBA winter occurred in the Beaufort Sea ice cover. In addition to the larger divergence, this part of the ice cover advected a longer distance toward the Chukchi Sea over the same period. The resulting deformation created a much larger volume of seasonal ice than the earlier year. Here, we summarize the contrast in the behavior of the ice cover over the two winters and relate their behavior to the large-scale wind pattern and atmospheric pressure distribution.